

11-347419US  
Amendment dated 01/08/2004

09/727,499

01750024aa  
Reply to office action mailed 10/10/2003

**Amendments to the Specification:**

Please replace the paragraph beginning at page 2, line 13, with the following rewritten paragraph:

A1  
When a failure in fingerprint reading occurs, the conventional fingerprint input apparatus issues an alarm of a failure occurrence or displays re-execution of a fingerprint reading. However, the conventional fingerprint input apparatus does not notify a user of the cause of an occurrence of a fingerprint reading failure. When a user recognizes the occurrence of a fingerprint reading failure, he cleans the finger and changes the position on which the finger is pressed against the fingerprint sensor. This operation is performed by the user in response to an assumed coping with the cause of a fingerprint reading failure ~~assumed by the user~~. That is, the user must take a countermeasure without recognizing the actual cause of a fingerprint reading failure.

Please replace the paragraph beginning at page 8, line 5, with the following rewritten paragraph:

A2  
The image capture and processing section 31 creates image data based on the output signal of the fingerprint sensor 1. The quality evaluation and processing section 32 evaluates the quality of image data created by the image capture and processing section 31. The evaluation is performed by referring to a fingerprint image and noting the ~~dense~~ density of a fingerprint portion, the area of a fingerprint portion, differences in density between a ridge and a groove, and the continuity of a ridge.

Please replace the paragraph beginning at page 8, line 14, with the following rewritten paragraph:

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Q3 When detecting an insufficient the ~~dense density~~ of an image (blur or failure in continuity of ridges), the quality evaluation and processing section 32 notifies the evaluation result display and processing section 33 of an occurrence of a fingerprint reading failure and of detection results. When detecting ~~the lack of the~~ a missing area of an image, the quality evaluation and processing section 32 notifies the evaluation result display and processing section 33 of an occurrence of a fingerprint reading failure and detection results. When detecting an excessive density of an image, the quality evaluation and processing section 32 notifies the evaluation result display and processing section 33 of an occurrence of a fingerprint reading failure and detection results.

Please replace the paragraph beginning at page 9, line 3, with the following rewritten paragraph:

Q3 The evaluation result display and processing section 33 drives the evaluation result display 2 based on notification content of the quality evaluation and processing section 32. When receiving a notification on detection of a blurred image, the evaluation result display and processing section 33 lights light emitting diodes corresponding to a message indicating an increase in moisture of a finger. When receiving a notification on detection of a ~~lacked~~ missing area of an image, the evaluation result display and processing section 33 lights light emitting diodes indicating an increase in the push pressure of a finger. When receiving an excessive ~~dense density~~ of an image, the evaluation result display and processing section 33 lights light emitting diodes corresponding to a message indicating a decrease in moisture and a decrease in push pressure of a finger.

Please replace the paragraph beginning at page 9, line 19, with the following rewritten paragraph:

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AS The image quality evaluation and processing section 32 transfers image data to the fingerprint authentication and processing section 34 when the quality of image data is good. The fingerprint authentication and processing section 34 extracts feature points from a fingerprint image indicating image data. The feature point means the shape of ridges of a fingerprint or the shape of a spiral indicating the center of a fingerprint. The fingerprint authentication and processing section 34 analyzes whether or not a spiral shape is roughly positioned at the center of a fingerprint image. When the spiral shape is not roughly positioned at the center of the fingerprint image or cannot be detected, the fingerprint authentication and processing section 34 judges that the feature points are ~~fault~~ faulty. The fingerprint authentication and processing section 34 notifies the evaluation result display and processing section 33 of an occurrence of a feature point failure and of detection results.

Please replace the paragraph beginning at page 12, line 2, with the following rewritten paragraph:

AC When detecting that the image is too thin (e.g. blur due to lack of density or shortage in area), the quality evaluation and processing section 32 notifies the evaluation result display and processing section 33 of the detection result. The evaluation result display and processing section 33 instructs the evaluation result display 2 to light the red light emitting diodes (step S105). On the evaluation result display 2, red light emitting diodes correspond to a message indicating an increase in moisture of a finger and an increase in pressure of a finger. The user, ~~which~~ who has recognized the lighting of the red light emitting diodes, can adjust the moisture of a finger and the pressure by the finger.

Please replace the paragraph beginning at page 12, line 15, with the following rewritten paragraph:

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A7

When detecting that the image is too dense (including a defaced image due to excessive density), the quality evaluation and processing section 32 notifies the evaluation result display and processing section 33 of the detection result. The evaluation result display and processing section 33 instructs the evaluation result display 2 to light the yellow light emitting diodes (step S106). On the evaluation result display 2, ~~red light~~ yellow light emitting diodes correspond to a message indicating a decrease in moisture of a finger, a decrease in pressure of a finger, and a change of the center position thereof. The user, ~~which~~ who has recognized the lighting of the yellow light emitting diodes, can adjust the moisture of a finger and a pressure by the finger.

Please replace the paragraph beginning at page 13, line 4, with the following rewritten paragraph:

A8

When the density of an image is good, the quality evaluation and processing section 32 extracts feature points of a fingerprint image. When a defect of feature points is detected, the quality evaluation and processing section 32 instructs the evaluation result display 2 to light, for example, the red light emitting diodes and the yellow light emitting diodes. On the evaluation result display 2, the simultaneous lighting of red and yellow light emitting diodes ~~correspond~~ corresponds to a message indicating a change of the position at which a finger presses. The user, ~~which~~ who has recognized the simultaneous lighting of the red and yellow light emitting diodes, can adjust the pressing position of the finger. A defect of feature points means that the spiral shape is shifted from the center of the image or that the amount of information regarding the shape of the ridges is insufficient.

Please replace the paragraph beginning at page 14, line 12, with the following rewritten paragraph:

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A9

As described above, in the fingerprint input apparatus of the present invention, a user can take measures ~~against to correct~~ the state of a finger, as indicated by the in accordance with light emitting diodes ~~glowed~~ activated. The countermeasure can be taken with reference to the message corresponding to light emitting diodes.

Please replace the paragraph beginning at page 15, line 23, with the following rewritten paragraph:

A10

Moreover, according to the present invention, the fingerprint input apparatus can avoid ~~that a user may be embarrassed~~ embarrassment caused by a reading failure ~~cause~~. The user can be released from unpleasantness caused by authentication failure or by because the cause of authentication failure that cannot be grasped.